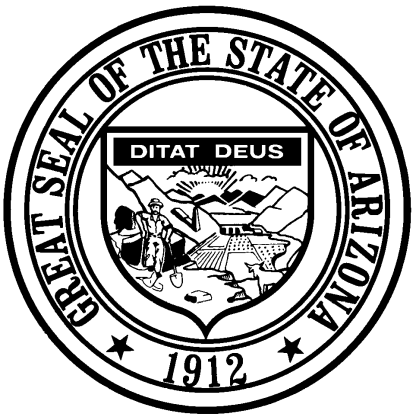

Testimony of
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Chairman Miller, Ranking Member McKeon and Committee Members, thank you for the opportunity to testify on an issue of great importance to all of us: the role of innovation in enhancing America's competitive standing.

I testify before you today wearing two hats, one as the Governor of Arizona and one as the chair of the National Governors Association, a bi-partisan organization representing the nation's governors. My testimony today is both informed by the experiences of my fellow governors and my own work in Arizona.

The Issue

Today's economy is increasingly global and highly competitive. While the United States remains the world leader in innovation, formidable competitors have emerged—and continue to emerge - as technology breaks down barriers and accelerates change. With demographic shifts, the rapid rate of technological advancements, and new methods of communication, Americans no longer solely compete against each other for jobs; they increasingly compete against well-educated and cheaper labor abroad. The only way the United States can compete in this global economy is to out-innovate the competition. Our growth, and ultimately our success, will be driven by our ability to develop new ideas and technologies and translate them into innovations, and to create a strong, agile workforce that evolves with a changing marketplace.

The Challenge

The challenge is upon us. In 2005, American companies received only four of the top ten patents worldwide. Finland, Israel, Japan, South Korea and Sweden each spend more on research and development than the United States as a share of GDP. China has overtaken the United States as the world's leading exporter of information technology products. In 2006, the World Economic Forum's *Global Competitiveness Report* dropped the United States from first to sixth in rankings of national competitiveness.

The quality of our workforce, moreover, is an even greater challenge. Businesses need employees who think innovatively and are capable of keeping up with the global economy. Yet, our country's 15 year-olds ranked 24th out of 39 countries in a 2003 examination, which assessed students' ability to apply mathematical concepts to real-world problems. In 2005, in both mathematics and science, less than 2/5 of U.S. 4th and 8th grade students performed at or above a proficient level. These are startling statistics and we are feeling the impact now. In 2004, the United States produced 137,000 new engineers compared to China's 352,000. Simply put, our public education system is not delivering the workforce we need to compete. American students aren't measuring up to other students around the world, and our country is not producing enough skilled professionals to create tomorrow's innovations.

The diminished ability to compete is reflected in real wages. The earnings of workers who have finished college have risen over the past 20 years, while the wages of those with less education attainment have fallen. Too many Americans are falling behind in an economy that is more global and vastly different than ever before.

Some look at these statistics and think not much can be done. I look at this as our nation's wake up call. This is our opportunity to reinvent our system of education and recapture our competitive edge. ***The answer is innovation, and the solution lies in our states. As governors, we believe states are the engines for change.***

What is Innovation?
"Innovation" is a term that deserves a new common definition. In the 1990's, innovation was about technology. Today, innovation is about reinventing strategies, products and processes, and creating new business models and new markets. It's about selecting the right ideas and executing at the right time. Innovation in the 21st century has moved beyond research laboratories, and today, reaches across disciplines. It requires talented people with the skills and resources necessary to compete and thrive in a global marketplace.

But this new form of innovation cannot develop in a vacuum. It requires an education system that is better than those of other nations. It requires first class research facilities, and vibrant communities designed to retain and attract talent. It requires a business climate that encourages and rewards discoveries and entrepreneurship. It requires improved economic development that focuses on our nation's competitiveness. Most important, it requires committed leadership at all levels of government - working with the private sector - to make it happen.

Why States?
States play a pivotal role in effecting change and creating innovative economies because they are major investors in the essential tools of that change.

Look at any state budget and you will find that more than half of it is dedicated to education—from pre-K through post-secondary. The reality is that in the United States, education is carried out and predominantly funded at the state level. Actualizing change in our system of education will happen in the states.

Likewise, states can be, and often are, the architects of the policies that cultivate innovation. Given the seriousness of the competitive challenge our country faces, it is critical for governors to develop strategies to accelerate innovative economies within their states.

This is the impetus behind my National Governors Association Chair's Initiative, ***Innovation America***. This initiative brings Governors, business leaders and higher education officials together to develop educational systems and economies that strengthen states' innovative capacity.

The ***Innovation America*** initiative has three main strategies:

1. Improving science, technology, engineering, and mathematics (STEM) education

2. Enabling the post-secondary education system to better support innovation

3. Encouraging business innovation through supportive state policies

K-12 Science, Technology, Engineering, and Mathematics (STEM) Education

First, states must create the human talent that powers innovation. A workforce of problem solvers, innovators, and inventors who are self-reliant and able to think logically is one of the critical foundations that drive innovative capacity in a state. Yet, as mentioned earlier, there is a growing consensus that American students are not attaining the basic knowledge they need to succeed, especially as it relates to science, technology, engineering, and math. These subjects are the foundation for innovation, and provide students with the skills needed to solve problems, experiment, and increase their awareness about the world around them.

The ***Innovation America*** initiative seeks to improve the rigor and relevance of science, technology, engineering, and mathematics (STEM) education in grades K-12 to ensure all students graduate from high school with the core competencies needed for a 21st century workforce and to motivate more students to pursue careers in science and technology. At the end of this month, as part of the Initiative, we will release the "Governors Guide to Building a K-12 Science, Technology, Engineering, and Mathematics Education Agenda," to support states' efforts in building a world-class K-12 STEM education system. We will also announce a new program to support state-level STEM education centers to build statewide capacity for improved STEM teaching and learning. Governors are uniquely positioned to address these challenges by establishing rigorous standards, expanding teacher training, and aligning curriculum with real world demands.

In Arizona, we formed the P-20 Council in 2005 to align K-12 and higher education with the needs of the new economy. Our Council, comprised of educators, community college and university presidents, elected officials, and business leaders, is focused on developing a strong foundation in science, technology, engineering and mathematics, and strengthening curriculum and standards to prepare students for post-secondary education and a 21st century workforce. The result is an education continuum, with classes building on ideas that were taught in years prior, and students better equipped with industry-specific skills in high-growth, high-wage occupations that await them when they graduate.

This year, at the Council's recommendation, I called on the Arizona State Board of Education to raise our standards to require four years of math instead of two, and three years of science instead of two. I also called on our schools to modernize our curricula, and bring 21st century skills into the classroom. We need technology embedded in our schools – to enhance learning and improve students' understanding of it. We need to move away from rote memorization and start teaching understanding and analysis. We need specialized environments for students interested in a particular area of study like Arizona's new Bioscience High School. Located just minutes from Arizona's bioscience hub, this school will connect students with tools, resources and experts from across the country. And we need more out-of-school time, hands-on activities – such as science fairs and robotics clubs – so that students can apply their learning in experiential ways.

Take, for example, Arizona's Carl Hayden Community High School's Science and Technology Club, which brings STEM skills to life through an after school robotics team. The team entered their first competition in 2004, opting to compete against university vs. high school students.

Their work paid off and they ended up winning the entire competition, beating top challengers like MIT.

Postsecondary Education

While the American higher education system has long been a centerpiece of the U.S. economy, and the launching pad for the jobs of the future, the skills needed today are far different than the expectations of yesterday. In the past, being well-versed in a single subject made the cut. Today, integrating diverse subject matters is as important as mastering individual ones. Students not only need to be well-rounded, they also need entrepreneurial skills, and the capacity to imagine and adapt to the unknown. Providing students with new skills taught in a new way is the first step toward developing tomorrow's innovators.

The second piece is equally important. Public universities are uniquely positioned to provide the pipeline of innovators for the local economies they surround. For example, the city of Tucson, Arizona has become the 'silicon valley' of optics because of its relationship and partnership with the publicly-funded University of Arizona.

The ***Innovation America*** initiative provides strategies to bring our country to the next level of innovation and prosperity. It asks universities to align their work, both the programs they offer to students and their research and development efforts, with the needs of the state's high growth industries. For example, in 2003 when I became Governor, the number of health care providers graduating from our universities was simply not keeping pace with our soaring population growth. We worked with these institutions to address this shortage, and today Arizona State University has the largest public nursing program in the country, and we're opening Phoenix's first medical school this fall.

In addition to more effectively matching graduates to high-demand careers, the Initiative seeks to showcase the great work of universities and bring their achievements to market. Some examples from my home state:

> **Arizona Telemedicine Program**
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> Its Arizona Telemedicine Program (ATP) located at the University of Arizona College of Medicine was created in 1996 with pilot funding from the state, and today, is recognized as one of the premier telemedicine programs in the world, providing telemedicine services, distance learning, informatics training and telemedicine technology assessment to communities throughout Arizona and beyond. Employing high-resolution interactive video imaging, digital photography, computer workstations and other technology, telemedicine allows physicians at distant locations to make diagnoses, conduct consultations and recommend treatment plans. Among its many initiatives, ATP piloted a virtual center for diabetes care that reaches out to medically underserved areas that have high incidences of pre-diabetes and diabetes. Its success is gaining national recognition. In 2005, ATP received $1.2 million in federal funds for the new Institute for Advanced Telemedicine and Telehealth (THealth), to be located at the new University of Arizona College of Medicine—Phoenix. The institute will conduct research and develop medical simulations, robotics and the design of "next-generation" medical devices.

Biodesign Institute
The Biodesign Institute at Arizona State University is focused on preventing and curing disease, overcoming the pain and limitations of injury, renewing and sustaining our environment, and securing a safer world. To accelerate the pace of discovery, the Institute merges formerly distinct fields of research, including biology, chemistry, physics, medicine, agriculture, environmental science, electronics, materials science, engineering and computing. In its short history, the Biodesign Institute has made measurable strides in delivering on its goals. This past year, Biodesign researchers received five patents, filed twenty new patent applications, and launched two spin-out companies. Among the research discoveries being translated to commercial endeavors are a drug with potential to save the lives of stroke victims; new tests to diagnose diseases more quickly and accurately; devices that rapidly detect explosives and biowarfare agents; the use of DNA forensics for law enforcement; and the design of next-generation flexible electronic displays with multiple applications in medicine, industrial processes and defense.

Sarver Heart Center
The Sarver Heart Center at The University of Arizona College of Medicine has pioneered a breakthrough method of cardiopulmonary resuscitation that emphasizes chest compressions and eliminates the need for mouth-to-mouth breathing. Called "continuous chest compression CPR," the innovative new approach has been shown to dramatically increase survival rates following cardiac arrest, and is easier to learn, remember and perform than standard CPR.

Growing Biotechnology Initiative
The Growing Biotechnology Initiative (GBI) at Northern Arizona University focuses on technology platforms in cancer, neurosciences, bioengineering, infectious diseases and diabetes identified in the Arizona Bioscience Roadmap. The GBI integrates cutting-edge research in these platform areas with nationally competitive undergraduate and graduate degree programs aimed at developing a highly skilled workforce to meet the demands of the rapidly developing bioscience industry.

Critical Path Institute (C-Path)
The Critical Path Institute (C-Path), an independent, non-profit organization located at the University of Arizona, was created in 2005 to support the U.S. Food and Drug Administration (FDA) in its effort to implement the Critical Path Initiative (CPI). It serves as a "trusted third party," working with the pharmaceutical industry to safely accelerate the development of and access to new medications. C-Path was recently awarded a national grant to evaluate genetic tests to improve treatment of cardiovascular disease.

InnovationSpace
InnovationSpace is an entrepreneurial joint venture between the colleges of design, business and engineering at Arizona State University that teaches students how to develop products that create market value while serving real societal needs and minimizing impacts on the environment. Interdisciplinary student teams work to define

new product offerings, develop and refine product concepts, build engineering prototypes, and create business plans and visual materials to market their products.

BIO5 Institute
The BIO5 Institute at the University of Arizona brings together some of the world's best scientists across five disciplines to collaborate on complex problems such as how to diagnose, treat, or prevent disease; how to feed a hungry world; and how to sustain our environment. BIO5 provides researchers with state of the art equipment in a setting that allows interaction on important research issues and provides the infrastructure necessary to translate scientific discoveries into tangible human benefit, increased economic development and a better-educated society.

The next step, and the goal of the ***Innovation America*** initiative, is to bring these new discoveries, innovations and cures to the marketplace. This leads to the Initiative's next strategy.

Business Innovation
While we prepare our students for a global economy and build our universities as pipelines for innovation, we must also cultivate a culture of innovation in the private sector.

The ***Innovation America*** initiative seeks to give states tools to develop policies that support research and development, enhance their innovation capacity and foster entrepreneurship. Specifically, the Initiative is helping governors promote business innovation by 1) assessing each state's economic performance and making policy recommendations for improving performance; 2) providing governors analyses of their state's most promising innovation clusters and a guidebook to cluster-based growth strategies; and 3) compiling and distributing best practices for the management of technology investment funds.

By reducing regulatory barriers, eliminating policies that inhibit the transfer of new ideas from the lab to the market, and creating tax policies that support the growth of innovative industries, states can lead this charge. States can also help entrepreneurs establish linkages with researchers, target workforce training and research and development to the needs of fast growing industries, and enhance opportunities for entrepreneurs to obtain early-stage investments, on which innovative products depend. Enhancing a state's innovation capacity puts its businesses in a stronger position to exploit the opportunities presented by changes in technologies – opportunities to increase productivity, develop new products, and expand into new markets.

States like Arizona have already started this work, accelerating prosperity through incentives for angel investment, which help small businesses and early stage companies attract much needed capital to expand operations and bring new ideas, products and services to market. Arizona's "angel investors" tax credits will spur $65 million in investment in life sciences and new technology development.

We are also focused on growing Arizona's entrepreneurial companies into globally competitive enterprises through programs leading to the commercialization of the latest discoveries, innovations and technology. Arizona's Innovation and Technology Commercialization Accelerator is a "virtual" pilot program through our state Department of Commerce. This program is designed to assist early-stage technology and bioscience companies, as well as

coordinate and effectively deliver technology commercialization services statewide. It offers grants to companies for technology assessment, commercialization feasibility, and assistance with marketing and licensing.

The Charge

Together, the strategies proposed by the ***Innovation America*** initiative seek to recapture our nation's competitive edge. By maximizing the potential of our students, we will produce the necessary talent pool. Through targeted investments in research and development and better coordination with the private sector, our universities can develop the workforce and pipeline for innovation. Finally, by developing state policies that foster innovation and encourage entrepreneurship, we can bring new inventions and discoveries to market and ensure the fruits of our labor stay at home.

In Arizona, these strategies are more than ideas on paper; they are our roadmap for success. Together, working with academia and the private sector, we are taking action to ensure that Arizona not only remains globally competitive, but is a world class leader in innovation. Take, for example, Arizona's bioscience industry. A few years ago, we determined that we were lagging behind the nation in bioscience research and needed to step up the pace. We developed a Bioscience Roadmap to assess our existing infrastructure and strengths, with the goal of making Arizona a national leader in the field within 10 years. A small, but rapidly growing bioscience private sector already existed, and we built on these efforts through the creation of the Translational Genomics Research Institute (TGen), a non-profit organization focused on developing earlier diagnostics, prognostics and therapies through genetics.

Since its founding in 2002, TGen has announced more than 15 new genetic discoveries including the identification of genes linked to Alzheimer's Disease, ALS, memory performance, prostate and brain cancer. TGen's success lies in both its biomedical research, and its impact on the Arizona economy. A report released in 2006, found TGen produces a nearly four to one return on state-invested funding and is expected to generate more than 3000 jobs and $202.4 million in total economic impact by 2025.

Efforts like TGen are possible at the state level, because of our ability to bring diverse stakeholders together and leverage resources to make an impact. Modeled after Science Foundation Ireland, we recently forged an unprecedented partnership between government, universities and the private sector to create Science Foundation Arizona, a multi-million dollar non-profit organization designed to build and strengthen Arizona's scientific, engineering and medical competitiveness. Supported by seed funding from the state, Science Foundation Arizona is working to attract world-class researchers to Arizona to diversify and expand Arizona's high-tech economic sector. Its Small Business Catalytic Funding initiative will be a stimulus for technology development, company formation and high-tech job creation in Arizona. And its largest funding priority, Strategic Research Groups, will fund partnerships between the private sector and universities. Most importantly, organizations like Science Foundation Arizona give states the flexibility to adjust to new paradigms more quickly and efficiently, and stay competitive in a global economy.

Our mission is bold, but we are on the path to success. In Arizona, we are building a premier education system from pre-school through college, and are working hand-in-hand with

businesses to make sure our students can meet the demands of the 21st century economy. We made a $440 million investment in new research facilities at our universities to house world-class talent. We created technology commercialization programs to enhance Arizona's science and technology core competencies and promote entrepreneurship. We have maintained a low-tax, business friendly environment, signing a historic business tax relief package into law to spur investment and attract companies to Arizona from around the country and across the globe.

The ***Innovation America*** initiative focuses on the actions states can take because, as I have demonstrated here, Governors are in the driver's seat when it comes to promoting innovation. At the same time, the federal government has a major role to play in addressing the challenges we face in this increasingly competitive global environment.

As you know, several major reports in recent years have recommended specific changes in federal policy and funding levels. At the heart of the recommendations is the importance of innovation. I am eager to begin a dialogue about how we can engage in complementary activities – maximizing our respective strengths – to enhance our economic competitiveness by creating an innovative nation.

Thank you for giving me the opportunity to testify about an issue that is so critical to the future of our states and our nation. Ultimately, this is not just a local concern, not just a state priority, and not just a federal problem. It is a national challenge. Working together, the public and private sectors can make meaningful progress in identifying educational and economic actions that make life even better for the next generation of American families.